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IMPLEMENTATION OF INFORMATION TECHNOLOGIES IN THE LIFE OF VISUALLY IMPAIRED PERSONS

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Annotation:
Technological advancement in general is providing better and cheaper solutions to assist the visually impaired (VI) community. Although information communication technology (ICT) has great potential to support the inclusion of VI people in educational, social and workforce settings, there are far fewer ICT projects for VI people compared to other projects. This systematic literature review provides our findings on the existing state of ICT projects and describes outstanding issues in ICT support of VI people. Based on our findings, we suggest increased collaboration among healthcare professionals, caregivers, programmers, engineers, as well as policy makers; and adoption of policies in future ICT projects for VI people.

Keywords: information communication technology (ICT), visually impaired (VI) people, systematic literature review, thematic analysis.

INTRODUCTION

According to the most recent survey by the World Health Organization (WHO), the number of visually impaired (VI) people in the world is 285 million, where approximately 39 million people are blind. Visual impairment includes both low vision and blindness (WHO, 2007). The majority of people with visual impairment (about 90%) live in developing countries and about 65% are aged 50 or above. Only 14% to 20% of people in developed countries suffer from dis- abilities in general, and these people have greater opportunities to take advantage of ICT-aided tools.

MATERIALS AND METHODS

Numerous studies have been conducted focusing on people with disabilities from a sociological point of view. McAnaney and Williams suggest using action research methods for disability management. Hogan et al. (2012) contend that people with disabilities face significant inequity of remuneration, globally, due to the perception of a lack of skills and employment accommodations for particular roles. Niehaus and Marfels (2010) identify the key competencies of disabled people by using factor

analysis and investigate the scope of their integration into the workforce and mainstream society.

RESULTS AND DISCUSSION

Until now, various intervention programs have been conducted for VI people, and the diverse applications of ICT show promise in using ICT-aided tools. Governments in both developed and developing countries are finding ways to empower VI people through education, where a better quality life may be achieved by introducing new technology-related interventions. A pertinent question to ask is whether all countries should follow a 'one-size-fits-all' view of ICT-aided technologies or should countries attempt to build theories and frameworks based on their own cultural and sociopolitical and socioeconomic contexts. ICT scholars have suggested that the theories practised and the frameworks established in developed countries should be adopted in the ICT programs of under-industrialised or developing countries so that local researchers can work under the guidance of those frameworks.

The NVivo 10 software was used to identify the most frequently used words, and to cluster the 37 articles into autogenerated subthemes (see Appendix A). The subthemes were:

. assistive technology
. electronic accessibility
. mobile learning
. virtual interface
. access to the information
. robotic technology.

These subthemes were grouped into the three key themes for our research: (a) assistive technology, (b) e- accessibility, and (c) virtual interface.

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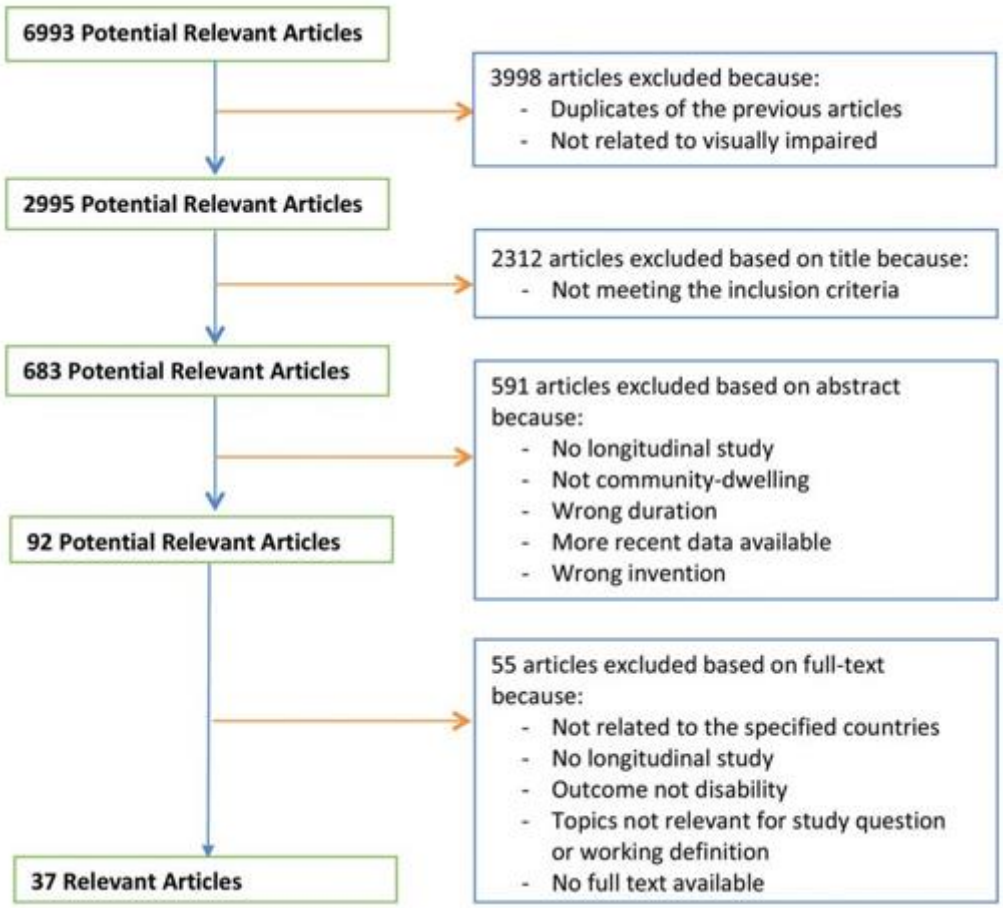

Figure 1. Steps in the inclusion and exclusion criteria.

While learning is very challenging for VI people, there exist various types of learning software and assistive technology–enabled educational content for specific educational processes for VI students. VI students show eagerness in computing courses using assistive technology even though many of their educational facilities do not offer courses on computing. However, Aziz, Mutalib, Sarif, and Jaafar (2013) argue that computer-based learning applications are not designed well enough for effective learning among VI students. Technologies such as screen readers and vocal synthesis are useful for VI people, albeit too generic.

E-accessibility is an effective tool at individual, community, national, and global levels. Access to information helps disabled people to manage their social contacts, coordinate their social events, and share their experiences and feelings. It has been reported that personalised and affordable e-accessible technologies support the learning process for people with visual impairment (Laabidi, Jemni, Jemni Ben Ayed, Ben Brahim, & Ben Jemaa, 2014; Singh, 2013; an internet library project was designed to provide access to online information and services for VI persons). Isaila and Nicolau (2010) argue that e-accessibility offers many opportunities for people with special needs that are unavailable

through other media, and that VI people using this media can be effectively integrated into the education system, labour market, and greater society.

Research shows that e-accessibility can act as an agent to transform the teaching and learning process to empower VI people. Singh (2013) finds that e- accessibility can assist VI people in transportation and communication. This study shows that the digital divide in e-accessibility can be decreased using optimised font size, colour and contrast, test recognising software, integrated GPS systems, screen readers, clear audio, text to speech books, and large button phones. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has always advocated for the importance of the 'intangible' components of ICT, such as policies and capacity-building. Addressing these components can fundamentally minimise the digital-disparity in learning for VI people (Samaniego, Laitamo, Valerio, & Francisco, 2012).

Singh and Moirangthem (2010) suggest that libraries, as a source of information and knowledge empowerment, need special initiatives to ensure services for VI students. Pascual, Ribera, Granollers, and Coiduras (2014) also found that VI users have better experiences and find self-confidence when websites are optimised to be used by them independently; however, web designers are less interested in such design due to cost and VI users do not complain if websites are not designed for them because of 'learned helplessness'. Another study reveals that VI students show great attraction to online courses because they are not identified as different from others. Unfortunately, website designers rarely offer web access optimised for VI people because of economic and financial barriers.

CONCLUSION

Our study identifies various advancements and issues related to the application of ICT for VI people. It is difficult to provide definitive conclusions and recommendations that apply to the entire VI community because there are various and ever-changing social contexts in which VI people live. For example, assistive technology helps to bring equal opportunities and minimise digital-disparity by using ICT-led technologies; however, economic disparity in developing countries may limit this minimisation process of digital-disparity. Therefore for future research, it would not be appropriate to compare, contrast and superimpose the results and issues found in our study across all developing countries.

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